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# तकनीकी प्रबन्धन — पारिभाषिक शब्दावली

# Technology Management — Glossary of Terms

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Management and Productivity Sectional Committee, MSD 04

## FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Management and Productivity Sectional Committee had been approved by the Management and Systems Division Council.

In this era of heightened competitiveness, the need to understand both business and technology, and the ability to manage the various aspects concerned with technology, has become very important. Technology management is the set of policies and practices that enable entities to manage their technologies and technology related processes to create competitive advantage. Technology management encompasses the following several aspects inclusive of,

a) technology strategy (a logic or role of technology in an organization);
b) technology forecasting (identification of possible future relevant technologies);
c) technology road mapping (mapping technologies to business and market needs by assimilating existing technologies into the business and anticipating the impact of emerging new technologies);
d) project portfolio (selection of a set of projects for development);
e) technology portfolio (a set of technologies in use), product and process development (including research and development);
f) technology transfer and acquisition (depending upon the technology needs); and
g) technology protection (safeguarding the intellectual property and other intangibles).

In a more general context, Technology Management can be defined as the integrated planning, design, optimization, operation, and control of technological products, processes and services, resulting in management of the use of technology for human advantage. Quite often, research and development forms an integral part of technology management. It is hence an integration of science, engineering and management disciplines for planning, developing, financing, marketing and implementing technological capabilities to strategize and achieve targeted goals that are in fusion with set objectives.

This standard has been formulated to bring about uniformity in the terms used generally in the area of technology management and thus do not pertain to any specific technology domain *per se*. In this standard, certain common words have been used. For instance, the word ‘entity’ refers to an organization that could be either an industrial, academic, government, research, Non-governmental, consultancy, etc.

The Committee responsible for the formulation of this standard is given in Annex A.

# *Indian Standard*

# TECHNOLOGY MANAGEMENT — GLOSSARY OF TERMS

## 1 SCOPE

This standard gives definitions of terms relating to technology management.

## 2 TERMS AND DEFINITIONS

For the purpose of this standard the following definitions shall apply.

**2.1 Acquisition** — It is taking over of one entity by another entity.

NOTE — This is in the context of merger and acquisition of entities. (*see* **2.65** and **2.99**).

**2.2 Applied Research** — For specific application, or problem solving (*see* **2.81**).

**2.3 Appropriate Technology** — The technology that is suitable to the environment and for the intended purpose.

**2.4 Assembled Technology** — The technology which produces goods that can be disassembled back into original components.

**2.5 Assessment of Technology** — *see* **2.101**.

**2.6 Basic Research** — Research that advances science and/or technology (*see* **2.81**).

NOTE — It is also sometimes refer to as fundamental research (*see* **2.43**) or pure research.

**2.7 Bench Scale Unit** — It is process model set up on a laboratory table/bench.

NOTE — As an example, the purpose could be to study variables such a~~s~~ input material, flow rate, pressure, temperature and the like, in a process set up. It usually refers to the stage, which is in between a laboratory scale unit and a pilot plant.

**2.8 Break-through Technology** — It is that technology which differs fundamentally from the previous generations resulting in significant change from the existing contemporary technology.

NOTE — For example, conventional camera and digital camera, where the digital camera is breakthrough technology.

**2.9 Business Environment** — It is the aggregate of external and internal influences, including economic, environmental, legal, political, social, cultural and technological factors, in which entities operate.

**2.10 Channels of Technology Flow** — It refers to the various methods through which technology is transferred.

NOTE — There are several channels of technology flow that can be classified into three broad groups, namely, (a) General channels inclusive of education, conferences, training and publications, (b) Reverse Engineering Channels, and (c) Planned channels such as joint ventures, franchising and licensing of technology through Technology Transfer Agreements.

**2.11 Collaborative Development** — Entities and/or individual(s) working together for achieving specific development targets.

NOTE — It could also cover public private partnerships (PPP).

**2.12 Commercially Proven Technology** — Technologies that have been used successfully for commercial production.

NOTE — The technology has been technically and economically viable as well as marketed successfully after having undergone a series of tests, updates and improvements.

**2.13 Communication Technology (CT)** — A technology associated with~~,~~ dissemination and transfer of information encompassing telephony, broadcast, audio and video processing and transmission and network based control and monitoring functions.

**2.14 Compatible Technology** — A technology that supports and works efficiently in unison with other technology/system.

**2.15 Competing Technology** — A technology having some comparable features of a reference technology that is viewed as its alternative.

**2.16 Competitive Advantage** — It is the strategic advantage of a technology or business entity over its competing entities within its competitive industry.

**2.17 Competitiveness** — It is a comparative concept of the ability and performance of an organization, sector or country to produce and/or sell and/or supply goods and/or services in a given market.

**2.18 Completely Knocked Down (CKD)** — It is a complete kit of totally disassembled parts needed to assemble a product.

**2.19 Contemporary Technologies** — Technologies which are available during the same time period.

**2.20 Contract Research and Development** — Outsourcing (*see* **2.73**) of research (*see* **2.81**) and development under specific contractual agreement.

**2.21 Copyright** — It is a legal right granted to a creator of, literary or dramatic or musical or artistic work including software, to protect it from being copied by another entity(ies).

NOTE — Copyright is one of the forms of Intellectual property rights (IPR) (*see* **2.57**).

**2.22 Core Competence** — It is the distinct capability and key area of expertize that are critical to an entity for achieving long-term growth.

**2.23 Core Technology** — The key elements of the technological features, skills and knowledge base of a technological solution.

**2.24 Corporate Strategy** — It refers to the overall scope and direction of an organization and the way in which its various business operations work together to achieve desired goals that meet the expectations of stakeholders.

**2.25 Cost Effective Technology** — A technology that provides value in relation to its cost.

**2.26 Cross Licensing** — An arrangement whereby two or more individual(s)/organization(s) grant right of use of specific intellectual property, owned by each, in return for a similar right from the other.

**2.27 Demonstration Unit** — A working prototype or an arrangement, to showcase the performance, output or other parameters of a product or a process.

NOTE — This is useful for inculcating confidence in potential customers or investors.

**2.28 Design** — A plan for the construction or execution of an object or a system for achieving the intended objective.

**2.29 Development** — A process of bringing out a new product, process, service or improvement over the existing ones.

**2.30 Discovery** — A finding or an observation not generally known before.

**2.31 Disruptive Technology** — It is one that, when introduced, either radically transforms markets, creates wholly new markets or displaces existing markets of the prevalent technology.

NOTE — It is generally significantly cheaper than the prevalent technology, and/or is much higher performing, and/or has greater functionality, and/or is more convenient to use. For example, floppy *versus* pen-drive.

**2.32 Drawings** — It is a pictorial representation of an engineering design.

**2.33 Economically Viable Technology** — The technology that generates economic returns commensurate with the input cost.

**2.34 Emerging Technology** — It refers to progressive developments arising from new knowledge creation.

NOTE — These may result in a field of technology which is projected to substantially alter the business and social environments.

**2.35 Enabling Technology** — The technology that spurs development of subsequent derivative technologies.

NOTE — Derivative technology is an off-shoot of the existing technology. For example, nano-technology pervades many diverse fields.

**2.36 Environment Friendly Technology** — The technology that improves/conserves the natural environment and resources or causes minimal harm to the environment.

**2.37 Evolving Technology** — Technology that would progressively develop over a comparatively long time horizon leading to substantial improvements over contemporary technology.

**2.38 Extension of Technology** — Use of an existing technology in new applications.

NOTE — For example, a stationary bicycle used for exercising.

**2.39 Factory Acceptance Test (FAT)** — The process of testing material, equipment, hardware and software at supplier's site to determine its parameters *vis-à-vis* the required specifications.

NOTE — The test could be carried out at the site of the manufacturer, supplier or buyer.

**2.40 Feasibility Report** — A document outlining the strengths and weaknesses of the existing or proposed venture, opportunities and threats presented by the environment, the resources required to carry through, and ultimately the prospects for success.

**2.41 Foreign Direct Investment (FDI)** — An investment of foreign funds by an investor(s) into an organization that operates in a country different from that of the investor(s).

**2.42 Foreign Technology Agreement (FTA)** — An agreement between a technology receiver and a foreign technology supplier.

**2.43 Fundamental Research** — It refer to 'Basic research' (*see* **2.6**).

**2.44 Futuristic Technology** — A technology that is likely to be developed or used in future.

**2.45 Generic Technology** — A generic technology is one that can be used in several applications.

NOTE — For example, Electric traction used for trams, metro, railways, etc.

**2.46 Globalization** — The process by which regional/national economies, societies, and cultures have become integrated through communication, transportation, and trade driven by a combination of economic, technological, socio-cultural, political, and biological factors.

NOTE — As an example, economic globalization is the increasing unification of the world's economic order through reduction of such barriers to international trade as tariffs, export fees, and import quotas.

**2.47 Green Field Technology** — A technology on which no prior work has been done.

**2.48 Imported Technology** — A technology that is acquired from a source outside the country of the acquirer.

**2.49 Incremental Innovation** — A small and/or marginal changes/improvements in the existing products, processes, services or systems.

**2.50 Indigenous Technology** — A technology that has been developed within a country.

**2.51 Industrial Design** — It refers to the legal rights protecting the features of shapes, configuration, pattern, ornament, or composition of lines or colours, applied to any article.

NOTE — This is one of the forms of intellectual property (*see* **2.56**).

**2.52 Information and Communication Technology (ICT)** — An integration of information technology (*see* **2.53**) and communication technology (*see* **2.13**).

**2.53 Information Technology (IT)** — A technology associated with acquisition (*see* **2.1**), processing, storage and analysis of vocal, pictorial, textual and numerical information by a network of processing devices.

**2.54 In-house Technology** — A technology that has been developed and owned by the organization.

**2.55 Innovation** — A new or better product, process, service or system that adds value.

**2.56 Intellectual Property** — A property created by the human mind/intellect.

**2.57 Intellectual Property Rights (IPR)** — It is a legal right granted by the Government to an individual(s)/organization(s) or a body for exclusive ownership of an intellectual property (*see* **2.56**) for a specific term.

NOTE — It has various forms like patents (*see* **2.74**), copyrights (*see* **2.21**), trade mark, industrial design (*see* **2.51**) and others.

**2.58 Invention** — A new product or a new process that is novel, non-obvious, and industrially applicable.

**2.59 Joint R&D** — A research (*see* **2.81**) and development (*see* **2.29**) undertaken jointly by two or more individuals or organizations.

**2.60 Joint Venture (JV)** — A venture wherein two or more entities work together and share resources and/or experiences and revenues to achieve common objectives.

**2.61 Laboratory Scale** — An initial model set up in a laboratory to validate the results of experiments.

**2.62 Lump Sum Payment** — A fixed amount of payment to be paid in one or more installments by a technology buyer to a technology seller.

**2.63 Mature Technology** — It is one that has been in use long enough that improvements have taken place and most of its initial faults and inherent problems have been removed or reduced by further development.

**2.64 Memorandum of Understanding (MOU)** — A formal document drawn up between two or more entities indicating an agreed line of action to meet an intended common objective.

**2.65 Merger** — Joining of two or more entities to form a single new entity.

NOTE — This is in the context of merger and acquisition of entities. May also refer to acquisition (*see* **2.1**).

**2.66 Milestone Payment** — A lumpsum payment (*see* **2.62**) paid in parts against achievement of pre-set bench marks.

**2.67 Nascent Technology** — A technology that is at its initial stages of development.

**2.68 New Product Development** — A multi-stage process commencing from conceptualization leading to commercialization of a new product.

NOTE — The various stages may involve ~~designs~~ design of the product, detailed engineering, market analysis and diffusion in the market.

**2.69 Obsolescent Technology** — It refer to 'Obsolete Technology' (*see* **2.70**).

**2.70 Obsolete Technology** — A state in a life cycle of a technology which is outdated in a given environmental context.

**2.71 Open-art Technology** — That technology which is not proprietary of any entity.

**2.72 Optimum Parameters** — The combination of technological factors which help to achieve the best possible yield in a given operating context.

**2.73 Outsourcing** — The process of contracting out an activity(ies), fully or partly, to another organization.

**2.74 Patent** — A legal right granted by Government to an individual(s)/organization(s) or a body for exclusive ownership of an invention for a specific term.

**2.75 Pilot Plant** — A working process unit built to generate information about the behaviour of a system for use in design of full/large scale plant.

**2.76 Product Life Cycle** — The process of managing the entire lifecycle of a product from its conception, through design, manufacture and logistics to service and disposal.

**2.77 Product Portfolio** — The collection of products offered by an organization that fits its business strategy.

**2.78 Proprietary Technology** — A technology that is owned by an entity and its use is controlled by the owner.

**2.79 Prototype** — A full scale working model initially built to assess the performance of the product as per the design.

**2.80 Radical Innovation** — An exploration of new technology which is fundamentally different from the existing technology.

NOTE — It is distinct from incremental innovation (*see* **2.49**).

**2.81 Research** — An analysis and/or creation of knowledge.

**2.82 Research and Development** — A creative work undertaken on a systematic basis in order to enhance the knowledge domain.

**2.83 Research and Development Cess** — A cess levied by the Government of India under the *R&D Cess Act*, 1986, on all payments made towards technology imports.

**2.84 Research, Design and Development (RDD)** — Integration of all elements including design, for culmination of research idea into development of a product, process, service or system.

**2.85 Residual Engineering** — Steps that are usually taken for implementation after the basic engineering has been established.

NOTE — An indicative list of such steps during residual engineering includes,

a) preparation of process flow diagrams and piping and instrumentation diagrams.
b) part simulation if situation demands.
c) mechanical code calculations.
d) thermal calculations.
e) hydraulic calculations.
f) sizing of pressure safety valves, control valves, etc.
g) control philosophy and logic developments.
h) instruction and startup manuals.

**2.86 Retrofitting** — The addition of new technology or features to older system.

**2.87 Royalty Payment** — An amount to be paid by a technology buyer/user to a technology owner/seller over a specified period of time based on percentage of output measured in terms of production or sales.

**2.88 Semi Knocked Down (SKD)** — A complete kit of partial assembled parts needed to assemble a product.

NOTE — See also Completely knocked down (CKD) (*see* **2.18**).

**2.89 Site Acceptance Test (SAT)** — It is a process of testing material, equipment, hardware and software at the customer's site to determine its parameters *vis-à-vis* the required specifications.

**2.90 Spin off Technology** — A technology that gets generated while working on another technology.

**2.91 State of the Art Technology** — The highest level of technological development reached at a particular point of time.

**2.92 Sustainable Technology** — A technology which continues to be in use over a long period of time.

NOTE — The factors which contribute to its longevity could be economic, social and ecological compliance.

**2.93 Technical Bid** — An offer containing technical features of the technology (as distinct from commercial) made by a potential supplier of technology to a potential buyer of technology.

**2.94 Technological Edge** — It refers to a position of advantage in respect of technological advancement.

**2.95 Technological Evolution** — It is the advancement of a particular technology in terms of deeper understanding of its features and better utilization.

**2.96 Technology** — A system of knowledge, techniques, skills, expertise and organization used to solve a problem, produce goods or services, or serve some purpose.

**2.97 Technology Absorption** — The process of understanding of the acquired technology by the receiver, which may result in development of capability to further optimize, customize and upgrade the technology.

**2.98 Technology Acquisition** — The process of acquiring technology from a technology supplier.

**2.99 Technology Adaptation** — The process wherein technology that is being acquired is modified by its receiver to suit local conditions and operating environment.

**2.100 Technology Adoption** — The process wherein technology that is being transferred is suitably modified by the supplier of technology to suit specific needs of the technology receiver.

**2.101 Technology Assessment** — It is the study of the characteristics, applications, outcomes and consequences of a technology.

NOTE — This is more particularly useful in case of new and emerging technologies. This is also known as assessment of technology (*see* **2.5**).

**2.102 Technology Assimilation** — The state when the technology is fully absorbed.

**2.103 Technology Audit** — It is the systematic procedure for evaluating the operational technological systems, procedures and processes in an organization with reference to set norms.

**2.104 Technology Benchmarking** — A method for comparing the performance of the technologies of an organization with the technologies of another organization.

**2.105 Technology Choice** — It is an outcome of assessment of technical, socio-economic, environmental and market factors leading to identification of technology option for development (*see* **2.29**) or acquisition (*see* **2.1**).

**2.106 Technology Collaboration/or/Partnership** — Where two or more entities work together on/for a technology, to attain the common objectives.

**2.107 Technology Commercialization** — It is the process of carrying out research (*see* **2.81**) and development (*see* **2.82**) that can lead to the introduction of new/improved products and/or services, and/or new/more efficient processes of production, and has been marketed successfully.

**2.108 Technology Custodian** — An entity that has the legal responsibility for management as well as safekeeping of technology.

**2.109 Technology Diffusion** — The process by which the technology is accepted by the consumer, leading to its wider use.

**2.110 Technology Diplomacy** — It is dialogue/collaboration amongst nations on technology issues for seeking solutions to common problems.

**2.111 Technology Documentation** — A set of documents that may comprise material and other specifications, flow charts, operational procedures, manual, intellectual property rights (IPR) (*see* **2.57**), assembly and usage instructions, maintenance schedules and other details relating to a particular technology.

**2.112 Technology Evaluation** — The analysis of a technology to assess its suitability for use in a particular environment in terms of its efficiency, resource availability and other local operating conditions.

**2.113 Technology Export** — The transfer of technology from home country to another country.

**2.114 Technology Follower** — An entity which implements a technology subsequent to the technology leader with respect to a particular context.

**2.115 Technology Forecasting** — The process of predicting the technologies that are likely to be prevalent in future.

**2.116 Technology Foresight** — A systematic process of identifying the evolving technologies (*see* **2.37**) with a view towards attaining quantum social, economic and ecological benefits.

**2.117 Technology Import** — The transfer of technology from another country to home country.

**2.118 Technology Intensive** — The extent of complexity of a technology in a product, process or system.

**2.119 Technology Know-how** — It refers to knowledge including skills, required to be implement a technology.

NOTE — It may include tangibles like blueprints, software, hardware, formulas, instruction, patterns, specifications, and trade-secrets; or intangibles like manufacturing practices, marketing concepts, quality control, and testing techniques, which are not common knowledge.

**2.120 Technology Know-what** — All the information needed to implement a technology (*see* **2.96**).

NOTE — The levels of knowledge-how and Know-why are progressively higher.

**2.121 Technology Know-why** — It refers to scientific principles, technological knowledge and reasoning, justifying the process of the implementation of the technology (*see* **2.96**).

NOTE — It may include explanations as to why a particular material, process or design has been used.

**2.122 Technology Laggard** — An entity which implements the technology far later than the technology follower with respect to a particular context.

**2.123 Technology Leader** — An entity which implements a technology that is considered to be state of the art with respect to a particular context.

**2.124 Technology Licensee** — An entity that has been granted the right to use a specific technology(ies) under an agreement.

**2.125 Technology Licensing** — It is granting the right to use a specific technology(ies) under an agreement.

**2.126 Technology Licensor** — An entity that grants the right to a technology licensee to use a specific technology under an agreement.

**2.127 Technology Life Cycle** — It is a graphic display of the rate of advancements in the technology versus time.

NOTE — It describes the dynamics of product, service, and/or process innovation. It depicts the various stages of development of technology, and is also referred to as Technology S-curve.

**2.128 Technology Management** — The integrated planning, design, optimization, operation and control of technological products, processes and services.

**2.129 Technology Mapping** — Collection and synthesis of information, which describes the time-lines and development patterns of a particular technology.

**2.130 Technology Market** — It is a platform where stakeholders engage in technology transfer (*see* **2.148**).

NOTE — Stakeholders would include knowledge generators, researchers and investors.

**2.131 Technology Marketing** — It is the effort to efficiently showcase and transfer technology.

NOTE — It covers aspects such as valuation of the technology, analysis of the technology customer, analysis of the technology market, planning of technology pricing/distribution/promotion and its execution.

**2.132 Technology Package** — In the context of technology transfer (*see* **2.148**), it refers to several components that are offered by the technology seller and may include drawings and designs, operation process parameters, specifications, maintenance and operation schedules, training material, intellectual property rights (*see* **2.57**) and software.

**2.133 Technology Policy** — A plan or course of action followed, generally by Government, in respect of technology.

**2.134 Technology Policy Statement** — A statement, generally made by Government, laying down a plan or course of action to be followed in the country, in respect of technology.

**2.135 Technology Portfolio** — A collection of selected technologies, which is in line with the overall organizational strategy.

**2.136 Technology Price** — The price at which a technology seller is sold.

**2.137 Technology Protection** — The measures taken or methods employed to safeguard technology from unauthorized use or access.

NOTE — Measures could include protection through intellectual property rights (*see* **2.57**), trade secrets, trademarks, copyright (*see* **2.21**), patents (*see* **2.74**), geographical indicators, etc. to safeguard the intangibles in a technology.

**2.138 Technology Pull** — It refers to technology which is developed in response to an identified market need (pull).

**2.139 Technology Push** — It is a new technology that is developed and offered (pushed) to the market to satisfy a perceived demand.

**2.140 Technology Risk** — The predictability and the uncertainties associated with the outcomes of technology development and/or acquisition (*see* **2.1**).

**2.141 Technology Roadmap** — A plan laid down in respect of various aspects of technology.

**2.142 Technology Selection** — It is making a choice from amongst available technology, after due analysis.

**2.143 Technology Sharing** — It is two or more entities or nations sharing a technology for mutual benefit.

**2.144 Technology Source** — An owner or an authorized seller of a technology.

**2.145 Technology Specifications** — An explicit set of parameters specifying a technology.

**2.146 Technology Strategy** — The activities of an organization directed towards building, maintaining and generating value from its technological assets.

**2.147 Technology Synergy** — The 'Working together' of two or more technologies in unison, resulting in far higher output as compared to the sum of their individual outputs.

**2.148 Technology Transfer** — A process that involves flow of technology from a seller to an acquirer.

**2.149 Technology Transfer Agreement** — An agreement between technology seller and technology acquirer covering various aspects of technology transfer (*see* **2.148**).

**2.150 Technology Transfer Negotiations** — It is the negotiations between technology seller and acquirer for technology transfer (*see* **2.148**) with an intention to arrive at an agreement for price and other various aspects of technology package (*see* **2.132**).

**2.151 Technology Upgradation** — It is a process of improving an existing technology.

**2.152 Technology Validation** — A process for confirming that technology would operate successfully in a given environment and in a given set of conditions.

**2.153 Technology Valuation** — The process of estimating the value of a technology (*see* **2.96**).

**2.154 Technology Vetting** — An evaluation by a technology by another entity with objective of its validation.

**2.155 Venture Capital Financing** — The infusion of equity capital that is provided at an early-stage to high potential and growth oriented organizations.

NOTE — This fund is normally given to technology intensive organizations.

# ANNEX A

(*Foreword*)

## COMMITTEE COMPOSITION

Management and Productivity Sectional Committee, MSD 4

| *Organization* | *Representative(s)* |
|---|---|
| Indian Institute of Materials Management, New Delhi | Shri V.K. Jain (***Chairman***) |
| Additional Directorate General of Financial Planning, New Delhi | Representative |
| Associated Chambers of Commerce and Industry of India (ASSOCHAM), New Delhi | Prof Aman Agarwal |
| Bharat Electronics Ltd, New Delhi | Shri Balraj Seth |
| Bharat Heavy Electricals Ltd, New Delhi | Shri K. K. Seth<br>Shri Jagdish Prasad (*Alternate*) |
| Confederation of Indian Industry, Bangalore | Dr Sarita Nagpal<br>Shri C. V. Rao (*Alternate*) |
| Directorate General of Quality Assurance, Kanpur | Shri Devki Nandan<br>Shri M. V. Kumbhalkar (*Alternate*) |
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| FICCI, New Delhi | Dr S. Bajaj |
| HCL Technologies, Noida | Representative |
| Indian Institute of Management, Indore | Prof V. K. Gupta |
| Indian Institute of Materials Management, New Delhi | Shri M. K. Bhardwaj |
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| Indian Institute of Foreign Trade, New Delhi | Ms Vijaya Katti<br>Dr Biswajit Nag (*Alternate*) |
| Indian Statistical Institute, New Delhi | Ms Rina Chakravorty |
| Larsen & Toubro Limited, Vadodara | Shri K. Ravindranath<br>Shri Mohammed Habibulla (*Alternate*) |
| Management Development Institute (MDI), Gurgaon | Dr B. Metri |
| Maruti Suzuki India Ltd, Gurgaon | Shri A. K. Tomer<br>Shri S. Bose (*Alternate*) |
| National Informatic Centre, New Delhi | Dr V. Sivaramakrishnaiah |
| Naval Headquarters, New Delhi | Capt D. K. Singh<br>Lt Cdr S. Sreekanth (*Alternate*) |
| Northern Railway, New Delhi | Representative |
| NITIE, Mumbai | |
| Ordnance Factory Board, Kolkata | Shri S. K. Yadav<br>Shri Sanjay Srivastav (*Alternate*) |
| Punj Lloyds Pvt Ltd, Gurgaon | Shri Adarsh Soni<br>Shri Mukesh Arora (*Alternate*) |
| Society for Human Resource Management (SHRM) | Dr Maria Christine Nirmala<br>Ms Dyna Ganapathy (*Alternate*) |
| Sri Venkateswara University, Tirupati, Andhra Pradesh | Prof. P. Rajasekhara Reddy |
| The Institute of Cost and Works Accountants of India, New Delhi | Shri J. P. Singh |
| WIPRO Technologies, Gurgaon | Representative |
| In personal capacity (*D-27, Panchsheel Enclave New Delhi 110017*) | Prof R. K. Sachdeva |

| *Organization* | *Representative(s)* |
|---|---|
| In personal capacity (*804, Chelsea Tower, Omxe Heights Vibhuti Khand, Gomtinagar, Lucknow 226010*) | PROF S. CHAKRABORTY |
| BIS Directorate General | SHRI N. K. PAL, Scientist 'F' and Head (MSD), [Representing Director General (*Ex- officio*)] |

*Member Secretary*
SHRIMATI RENU GUPTA
Scientist 'E' (Management and Systems), BIS

## Panel on Technology Management, MSD 4/P-25

| *Organization* | *Representative(s)* |
|---|---|
| Indian Institute of Foreign Trade (IIFT), New Delhi | SHRI DEEPAK BHATNAGAR (***Convener***) |
| Engineers India Ltd, Gurgaon | SHRI SHEO RAJ SINGH |
| Department of Scientific and Industrial Research, New Delhi | DR (SHRIMATI) JYOTI S. A. BHAT |
| In personal capacity (*B-4, 129, Safdarjung Enclave, New Delhi 110029*) | DR VINAY KUMAR |

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